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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/287,573	04/06/1999	DAVID R. WALT	A-67207-2/DJB/RMS/DCF	6459

7590 11/01/2004

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EXAMINER

GABEL, GAILENE

ART UNIT	PAPER NUMBER
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1641

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/287,573

Applicant(s)

WALT ET AL.

Examiner

Gailene R. Gabel

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2004 and 23 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-48 is/are pending in the application.
- 4a) Of the above claim(s) 16-19, 23-26, 40-45 and 48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-22, 27-39, 46 and 47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 16-48 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. PCT/US98/21193.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/23/04 has been entered.

Amendment Entry

2. Applicant's amendment and response filed 7/21/04 is acknowledged and has been entered. Claims 20, 27, 28, 32-35, 38, 39, and 46 have been amended. Claims 16-19, 23-26, 40-45, and 48 remain withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being claims drawn to a non-elected invention. Currently, claims 16-48 are pending. Claims 20-22, 27-39, 46, and 47 are under examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 20-22, 27-39, 46, and 47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 27 is ambiguous for omitting essential structural and functional cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. In this case, it is unclear how the claimed identical sensor elements within each subpopulation in the array structurally and functionally relate to a first target analyte to which the array is contacted, in order to obtain measurements, perform statistical analysis therefrom, and determine statistical validity of the measurements in the method. Please clarify.

Claim 20 is confusing in being contradictory to claim 27 from which it depends since claim 27 recites "an array with a plurality of subpopulations of sensor elements". Accordingly, it appears that the array in claim 20 which "comprises a population of beads" should instead comprise "subpopulations of beads dispersed on a substrate."

Claim 32 lacks antecedent support in reciting, "said first and second measurements."

Claim 33 lacks antecedent support in reciting, "said first and second measurements."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 27-39, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinkel et al. (US Patent 5,837,196) in view of Bierre et al. (US Patent 5,739,000).

Pinkel et al. disclose a method of simultaneous measurement of target analytes wherein an optical fiber array having a plurality of subpopulations of identical sensor elements (optical fibers bundled together bearing a single type species) is provided and contacted with a sample comprising target analytes. Each sensor element is uniquely addressed and each subpopulation bears distinct bioactive agents (biological binding partner) present in the optical fiber array bearing multiple species (see column 3, line 39 to column 4, line 26 and column 14, lines 36-43). The bioactive agents which are uniquely addressed include oligonucleotides, nucleic acids, and proteins (see column 3, lines 8-22, column 4, lines 27-34 and 55-67 and column 6, lines 30-39). Pinkel et al. teach that use of concave or convex sensor ends provides a greater surface area upon which to immobilize the bioactive agents to thus, increase the signal to noise ratio per optical fiber of the biosensor (see column 8, lines 22-25). The substrate used includes glass or plastic (see column 11, lines 50-55). A detector can be arranged to read signals and obtain simultaneous measurements, i.e. first and second measurements, from a single sensor element of the optical fiber or from a group of sensor elements from a population or bundle of optical fibers (see column 9, lines 23-57). By examining the uniquely addressed transmission ends of fibers or groups of fibers, the addressed transmission ends can transmit unique patterns for rapid identification and

measurement of analytes by the sensor (see column 4, lines 21-25). The detector system may also be equipped with a computerized data acquisition system and analytical program to enable a variety of different measurements to be made and diverse parameters measured (see column 13, lines 33-56).

Pinkel et al. differ from the instant invention in failing to teach specific statistical analysis of measurements by determining and excluding outlying beads from subpopulations, calculating a mean and standard deviation between measurements, evaluating statistical validity on the measurements, evaluating the measurements using confidence intervals, performing hypothesis testing, performing cluster analysis of measurements, and performing comparative evaluation between statistical analyses, as recited in claims 31-39.

Bierre et al. disclose a method of multiparameter data analysis which employs analyzing data by construction of a population hierarchy, wherein cell populations are not mutually exclusive. Bierre et al. specifically obtained measurements to collect a plurality of parameters for each particle (bead) in a sample and performed statistical analysis on the obtained measurements. Statistical analyses performed include calculating a mean and standard deviation for the measurements, evaluating statistical validity of the measurements by defining and selecting particles into mutually exclusive clusters and subclusters, i.e. cluster analysis, and repeating statistical analysis for purposes of comparing and evaluating confidence intervals between measurements. See claims 1-3, 6, 11, and 12.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to incorporate the teaching of Bierre into the method of Pinkel using optical fiber array having a plurality of subpopulations to simultaneously measure the presence of target analytes in a sample because Bierre specifically taught that statistical analysis of cell or particle populations such as those in an array as in the method of Pinkel, presents a user with great flexibility in defining distinct and overlapping populations of particles or beads for use in subsequent examination. Additionally, statistical analysis, i.e. calculating mean/average, standard deviation, precision/repeatability of a method as reflected in a second analysis, confidence intervals, correlation studies, and distribution/cluster analysis is part of standard laboratory practice and required in optimization procedures; hence, it would have been obvious for one of ordinary skill to use statistical analysis strategies known and conventionally used in chemical and immunological art to evaluate measurements obtained from a known method.

5. Claims 20, 22, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinkel et al. (US Patent 5,837,196) in view of in view of Bierre et al. (US Patent 5,739,000), as applied to claims 27-39 and 47 above, and in further view of Stimpson et al. (US Patent 5,559,668).

Pinkel et al. and Bierre et al. have been discussed supra. Pinkel et al. and Bierre et al. differ from the instant invention in failing to teach that the sensor elements are beads in an array dispersed on a substrate selected from glass or plastic.

Stimpson et al. disclose a waveguide binding assay method wherein an array comprising a plurality of subpopulations of light scattering beads (particles) are sensor elements for binding with target analytes (see Abstract and column 16, lines 27-64). The beads are colloidal metals such as gold and are dispersed on a substrate (waveguide or element) composed of either plastic or glass (see column 10, lines 33-59). Stimpson et al. also disclose that location of each of sensor element within the arrays can be configured, located, and identified (see columns 11 and 12).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to incorporate the light scattering beads for use as sensor elements as taught by Stimpson into the optical fiber array used in the method of Pinkel as modified by Bierre because Stimpson specifically taught that light scattering beads, used as sensor elements, can increase acquisition of data or results by two orders of magnitudes by simultaneous interrogation; thus, allowing simultaneous measurements of the beads at multiple sites of an array and permitting extremely rapid acquisition of data.

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pinkel et al. (US Patent 5,837,196) in view of Bierre et al. (US Patent 5,739,000), as applied to claims 27-39 and 47 above, and in further view of Stimpson et al. (US Patent 5,559,668) and Sadana et al. (Sensors and Actuators B-Chemical, 32 (3): 195-201).

Pinkel et al. and Bierre et al. have been discussed supra. Pinkel et al. and Bierre et al. differ from the instant invention in failing to teach that the substrate upon which the beads are dispersed is a fiber optic bundle.

Stimpson et al. has been discussed supra.

Sadana et al. teach beads dispersed on a fiber-optic bundle, which is an antibody-based biosensor for use in fractal analysis method. (See Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to incorporate light scattering beads for use as sensor elements as taught by Stimpson and dispersed on a fiber-optic bundle as taught by Sadana, into the method of Pinkel as modified by Bierre because Stimpson specifically taught that light scattering beads, used as sensor elements in the method of Pinkel and Bierre, can increase acquisition of data or results by simultaneous interrogation; thus, allowing simultaneous measurements of the beads at multiple sites of an array and permitting extremely rapid acquisition of data and Sadana specifically taught application of such beads on a fiber optic bundle in an antibody-based biosensor.

Response to Arguments

7. Applicant's arguments with respect to claims 20-22, 27-39, 46, and 47 have been considered but are moot in view of the new grounds of rejection.
8. For reasons aforementioned, no claims are allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gailene R. Gabel whose telephone number is (571) 272-0820. The examiner can normally be reached on Monday, Tuesday, and Thursday, 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gailene R. Gabel
Patent Examiner
Art Unit 1641
October 28, 2004

gg

Christopher L. Chin

CHRISTOPHER L. CHIN
PRIMARY EXAMINER
GROUP 1800/641
10/31/04